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AMENDMENTS TO THE CLAIMS

The claims in this listing will replace all prior versions, and listings, of claims in the application.

Claims 1-20. (Canceled)

21. (New) A method for detecting a position of a mobile station in a system using at least three base stations comprising measuring distances between the mobile station and the three base stations and detecting the position of the mobile station based on the measured distances, wherein the measurement of the distance between the mobile station and each base station comprises:

transmitting a first periodical signal from the base station using a broadcast channel, the first periodical signal having a periodicity synchronous with a first reference timing generated by a reference timer of the base station;

transmitting a second periodical signal from the mobile station, the second periodical signal having a periodicity synchronous with a second reference timing generated by a reference timer of the mobile station;

receiving the first periodical signal from the base station at the mobile station and obtaining a phase difference, at the mobile station, based on the second reference timing, the phase difference comprising a time interval between the second reference timing and a reception timing of said second periodical signal at the mobile station;

receiving the second periodical signal from the mobile station at the base station and obtaining a phase difference, at the base station, based on the first reference timing, the phase difference comprising a time interval between the first reference timing and a reception timing of said first periodical signal at the base station;

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detecting a reference timing difference between the mobile station and the base station based on the phase differences at the mobile station and the base station;

matching the reference timer of the mobile station with the reference timer of the base station based on the reference timing difference; and

obtaining a distance between the mobile station and the base station based on the phase differences.

22. (New) The method according to claim 21, wherein the measurement of the distance between the mobile station and each base station further comprises:

transmitting a measuring signal between the mobile station and the base station and detecting the distance between the mobile station and the base station based on a propagation time of the measuring signal; and

determining a communication period of the measuring signal based on an allowable error in measuring the distance, a distance resolution in measuring the distance, and relative velocity information between the mobile station and the base station.

23. (New) The method according to claim 22, wherein the measurement of the distance between the mobile station and each base station further comprises determining the communication period of the measuring signal in the mobile station and reporting said communication period to the base station.

24. (New) The method according to claim 23, wherein the measurement of the distance between the mobile station and each base station further comprises:

determining a symbol rate of the measuring signal based on the communication period of said measuring signal and an information amount required in measuring the distance;

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obtaining an intermittent time of the measuring signal based on the symbol rate, the communication period and the information amount; and

turning off transmission power during the intermittent time for each communication of the measuring signal.

25. (New) The method according to claim 24, wherein the measurement of the distance between the mobile station and each base station further comprises determining the communication period and the symbol rate in the mobile station and reporting said communication period and symbol rate to the base station.

26. (New) A position detecting apparatus provided in a mobile station to detect a position of the mobile station in a system using at least three base stations by measuring distances between the mobile station and the three base stations and detecting the position of the mobile station based on the measured distances, said position detecting apparatus measuring the distance between the mobile station and each base station, said position detecting apparatus comprising:

a receiver that receives a first periodical signal transmitted from the base station using a broadcast channel, and obtains a mobile side phase difference based on a mobile side reference timing generated by a mobile side reference timer of the apparatus, said first periodical signal having a periodicity synchronous with a base station side reference timing generated by a base station side reference timer, and the mobile side phase difference comprising a time interval between the mobile side reference timing and a reception timing of the first periodical signal;

a transmitter that transmits a second periodical signal to the base station, said second periodical signal having a periodicity synchronous with the mobile side reference

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timing;

a matcher that matches the mobile side reference timer with the base station side reference timer based on a reference timing difference between the mobile side phase difference and a base station side phase difference detected in the base station upon reception of the first periodical signal based on the base station side reference timing, said base station side phase difference comprising a time interval between the base station side reference timing and a reception timing of the first periodical signal; and

an obtainer that obtains a distance between the mobile station and the base station based on the phase differences,

wherein a measuring signal is transmitted between the mobile station and the base station and the distance between the mobile station and the base station is measured based on a propagation time of the measuring signal, and

wherein a communication period of the measuring signal is determined based on an allowable error in measuring the distance, a distance resolution in measuring the distance, and relative velocity information between the mobile station and the base station.

27. (New) An apparatus to be mounted on a vehicle, said apparatus being provided with a distance detecting apparatus for detecting a position of the vehicle in a system using at least three base stations by measuring distances between the vehicle and the three base stations and detecting the position of the vehicle based on the measured distances, said position detecting apparatus measuring the distance between the vehicle and each base station, said apparatus comprising:

a receiver that receives a first periodical signal transmitted from a base station using a broadcast channel, and obtains a vehicle side phase difference based on a vehicle side

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reference timing generated by a vehicle side reference timer of the apparatus, said first periodical signal having a periodicity synchronous with a base station side reference timing generated by a base station side reference timer, and the vehicle side phase difference comprising a time interval between the vehicle side reference timing and a reception timing of the first periodical signal;

a transmitter that transmits a second periodical signal to the base station, said second periodical signal having a periodicity synchronous with the vehicle side reference timing;

a matcher that matches the vehicle side reference timer with the base station side reference timer based on a reference timing difference between the vehicle side phase difference and a base station side phase difference detected in the base station upon reception of the first periodical signal based on the base station side reference timing, said base station side phase difference comprising a time interval between the base station side reference timing and a reception timing of the first periodical signal; and

an obtainer that obtains a distance between the vehicle and the base station based on the phase differences,

wherein a measuring signal is transmitted between the vehicle and the base station and the distance between the vehicle and the base station is measured based on a propagation time of the measuring signal, and

a communication period of the measuring signal is determined based on an allowable error in measuring the distance, a distance resolution in measuring the distance, and relative velocity information between the vehicle and the base station.